



SEQUENCE LISTING

<110> SHERMAN, LINDA A.
LUSTGARTEN, JOSEPH

<120> RECOMBINANT CONSTRUCTS ENCODING T CELL RECEPTORS
SPECIFIC FOR HUMAN HLA-RESTRICTED TUMOR ANTIGENS

<130> 48340/55793-DIV

<140> 09/774,681

<141> 2001-02-01

<150> 08/812,393

<151> 1997-03-05

<150> 60/012,845

<151> 1996-03-05

<160> 65

<170> PatentIn Ver. 3.2

<210> 1

<211> 1350

<212> DNA

<213> Artificial Sequence

<220>

<221> CDS

<222> (1)..(1332)

<220>

<223> Description of Artificial Sequence: Synthetic
single chain TCR derivative nucleotide sequence

<400> 1

ctc	gag	atg	cag	agg	aac	ctg	gga	gct	gtg	ctg	ggg	att	ctg	tgg	gtg	48
Leu	Glu	Met	Gln	Arg	Asn	Leu	Gly	Ala	Val	Leu	Gly	Ile	Leu	Trp	Val	
1				5					10					15		

cag	att	tgc	tgg	ctg	aaa	gaa	cag	caa	gtg	cag	cag	agt	ccc	gca	tcc	96
Gln	Ile	Cys	Trp	Leu	Lys	Glu	Gln	Gln	Val	Gln	Gln	Ser	Pro	Ala	Ser	
			20						25					30		

ttg	gtt	ctg	cag	gag	ggg	gag	aac	gca	gag	ctc	cag	tgt	agc	ttt	tcc	144
Leu	Val	Leu	Gln	Glu	Gly	Glu	Asn	Ala	Glu	Leu	Gln	Cys	Ser	Phe	Ser	
			35				40					45				

atc	ttt	aca	aac	cag	gtg	cag	tgg	ttt	tac	caa	cgt	cct	ggg	gga	aga	192
Ile	Phe	Thr	Asn	Gln	Val	Gln	Trp	Phe	Tyr	Gln	Arg	Pro	Gly	Gly	Arg	
			50				55				60					

ctc	gtc	agc	ctg	ttg	tac	aat	cct	tct	ggg	aca	aag	cag	agt	ggg	aga	240
Leu	Val	Ser	Leu	Leu	Tyr	Asn	Pro	Ser	Gly	Thr	Lys	Gln	Ser	Gly	Arg	
			65				70				75				80	

ctg aca tcc aca aca gtc att aaa gaa cgt cgc agc tct ttg cac att	288
Leu Thr Ser Thr Thr Val Ile Lys Glu Arg Arg Ser Ser Leu His Ile	
85 90 95	
tcc tcc tcc cag atc aca gac tca ggc act tat ctc tgt gcc tca aat	336
Ser Ser Ser Gln Ile Thr Asp Ser Gly Thr Tyr Leu Cys Ala Ser Asn	
100 105 110	
tct gga gga agc aat gca aag cta acc ttc ggg aaa ggc act aaa ctc	384
Ser Gly Gly Ser Asn Ala Lys Leu Thr Phe Gly Lys Gly Thr Lys Leu	
115 120 125	
tct gtt aaa tca ggt ggc gga ggg tct ggc ggg ggt gga tcc ggg ggt	432
Ser Val Lys Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly	
130 135 140	
gga ggc tca gag gct gca gtc acc caa agc cca aga aac aag gtg gca	480
Gly Gly Ser Glu Ala Ala Val Thr Gln Ser Pro Arg Asn Lys Val Ala	
145 150 155 160	
gta aca gga gga aag gtg aca ttg agc tgt aat cag act aat aac cac	528
Val Thr Gly Gly Lys Val Thr Leu Ser Cys Asn Gln Thr Asn Asn His	
165 170 175	
aac aac atg tac tgg tat cgg cag gac acg ggg cat ggg ctg agg ctg	576
Asn Asn Met Tyr Trp Tyr Arg Gln Asp Thr Gly His Gly Leu Arg Leu	
180 185 190	
atc cat tat tca tat ggt gct ggc agc act gag aaa gga gat atc cct	624
Ile His Tyr Ser Tyr Gly Ala Gly Ser Thr Glu Lys Gly Asp Ile Pro	
195 200 205	
gat gga tac aag gcc tcc aga cca agc caa gag aac ttc tcc ctc att	672
Asp Gly Tyr Lys Ala Ser Arg Pro Ser Gln Glu Asn Phe Ser Leu Ile	
210 215 220	
ctg gag ttg gct acc ccc tct cag aca tca gtg tac ttc tgt gcc agc	720
Leu Glu Leu Ala Thr Pro Ser Gln Thr Ser Val Tyr Phe Cys Ala Ser	
225 230 235 240	
ggg gag aca ggg acc aac gaa aga tta ttt ttc ggt cat gga acc aag	768
Gly Glu Thr Gly Thr Asn Glu Arg Leu Phe Phe Gly His Gly Thr Lys	
245 250 255	
ctg tct gtc ctg act agt aac tcc atc atg tac ttc agc cac ttc gtg	816
Leu Ser Val Leu Thr Ser Asn Ser Ile Met Tyr Phe Ser His Phe Val	
260 265 270	
ccg gtc ttc ctg cca gcg aag ccc acc acg acg cca gcg ccg cga cca	864
Pro Val Phe Leu Pro Ala Lys Pro Thr Thr Thr Pro Ala Pro Arg Pro	
275 280 285	
cca aca ccg gcg ccc acc atc gcg tgc cag ccc ctg tcc ctg cgc cca	912
Pro Thr Pro Ala Pro Thr Ile Ala Ser Gln Pro Leu Ser Leu Arg Pro	
290 295 300	

```

tct agt tct aga gat ccc aaa ctc tgc tac ctg ctg gat gga atc ctc 960
Ser Ser Ser Arg Asp Pro Lys Leu Cys Tyr Leu Leu Asp Gly Ile Leu
305 310 315 320

ttc atc tat ggt gtc att ctc act gcc ttg ttc ctg aga gtg aag ttc 1008
Phe Ile Tyr Gly Val Ile Leu Thr Ala Leu Phe Leu Arg Val Lys Phe
325 330 335

agc agg agc gca gac gcc ccc gcg tac cag cag ggc cag aac cag ctc 1056
Ser Arg Ser Ala Asp Ala Pro Ala Tyr Gln Gln Gly Gln Asn Gln Leu
340 345 350

tat aac gag ctc aat cta gga cga aga gag gag tac gat gtt ttg gac 1104
Tyr Asn Glu Leu Asn Leu Gly Arg Arg Glu Glu Tyr Asp Val Leu Asp
355 360 365

aag aga cgt ggc cgg gac cct gag atg ggg gga aag ccg aga agg aag 1152
Lys Arg Arg Gly Arg Asp Pro Glu Met Gly Gly Lys Pro Arg Arg Lys
370 375 380

aac cct cag gaa ggc ctg tac aat gaa ctg cag aaa gat aag atg gcg 1200
Asn Pro Gln Glu Gly Leu Tyr Asn Glu Leu Gln Lys Asp Lys Met Ala
385 390 395 400

gag gcc tac agt gag att ggg atg aaa ggc gag cgc cgg agg ggc aag 1248
Glu Ala Tyr Ser Glu Ile Gly Met Lys Gly Glu Arg Arg Arg Gly Lys
405 410 415

ggg cac gat ggc ctt tac cag ggt ctc agt aca gcc acc aag gac acc 1296
Gly His Asp Gly Leu Tyr Gln Gly Leu Ser Thr Ala Thr Lys Asp Thr
420 425 430

tac gac gcc ctt cac atg cag gcc ctg ccc cct cgc taa gcg gcc gcc 1344
Tyr Asp Ala Leu His Met Gln Ala Leu Pro Pro Arg
435 440

acc gcg 1350

<210> 2
<211> 444
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
single chain TCR protein

<400> 2
Leu Glu Met Gln Arg Asn Leu Gly Ala Val Leu Gly Ile Leu Trp Val
1 5 10 15

Gln Ile Cys Trp Leu Lys Glu Gln Gln Val Gln Gln Ser Pro Ala Ser
20 25 30

Leu Val Leu Gln Glu Gly Glu Asn Ala Glu Leu Gln Cys Ser Phe Ser
35 40 45

```

Ile	Phe	Thr	Asn	Gln	Val	Gln	Trp	Phe	Tyr	Gln	Arg	Pro	Gly	Gly	Arg	50	55	60
Leu	Val	Ser	Leu	Leu	Tyr	Asn	Pro	Ser	Gly	Thr	Lys	Gln	Ser	Gly	Arg	65	70	75
Leu	Thr	Ser	Thr	Thr	Val	Ile	Lys	Glu	Arg	Arg	Ser	Ser	Leu	His	Ile	85	90	95
Ser	Ser	Ser	Gln	Ile	Thr	Asp	Ser	Gly	Thr	Tyr	Leu	Cys	Ala	Ser	Asn	100	105	110
Ser	Gly	Gly	Ser	Asn	Ala	Lys	Leu	Thr	Phe	Gly	Lys	Gly	Thr	Lys	Leu	115	120	125
Ser	Val	Lys	Ser	Gly	Gly	Gly	Gly	Ser	Gly	Gly	Gly	Gly	Ser	Gly	Gly	130	135	140
Gly	Gly	Ser	Glu	Ala	Ala	Val	Thr	Gln	Ser	Pro	Arg	Asn	Lys	Val	Ala	145	150	155
Val	Thr	Gly	Gly	Lys	Val	Thr	Leu	Ser	Cys	Asn	Gln	Thr	Asn	Asn	His	165	170	175
Asn	Asn	Met	Tyr	Trp	Tyr	Arg	Gln	Asp	Thr	Gly	His	Gly	Leu	Arg	Leu	180	185	190
Ile	His	Tyr	Ser	Tyr	Gly	Ala	Gly	Ser	Thr	Glu	Lys	Gly	Asp	Ile	Pro	195	200	205
Asp	Gly	Tyr	Lys	Ala	Ser	Arg	Pro	Ser	Gln	Glu	Asn	Phe	Ser	Leu	Ile	210	215	220
Leu	Glu	Leu	Ala	Thr	Pro	Ser	Gln	Thr	Ser	Val	Tyr	Phe	Cys	Ala	Ser	225	230	235
Gly	Glu	Thr	Gly	Thr	Asn	Glu	Arg	Leu	Phe	Phe	Gly	His	Gly	Thr	Lys	245	250	255
Leu	Ser	Val	Leu	Thr	Ser	Asn	Ser	Ile	Met	Tyr	Phe	Ser	His	Phe	Val	260	265	270
Pro	Val	Phe	Leu	Pro	Ala	Lys	Pro	Thr	Thr	Thr	Pro	Ala	Pro	Arg	Pro	275	280	285
Pro	Thr	Pro	Ala	Pro	Thr	Ile	Ala	Ser	Gln	Pro	Leu	Ser	Leu	Arg	Pro	290	295	300
Ser	Ser	Ser	Arg	Asp	Pro	Lys	Leu	Cys	Tyr	Leu	Leu	Asp	Gly	Ile	Leu	305	310	315
Phe	Ile	Tyr	Gly	Val	Ile	Leu	Thr	Ala	Leu	Phe	Leu	Arg	Val	Lys	Phe	325	330	335
Ser	Arg	Ser	Ala	Asp	Ala	Pro	Ala	Tyr	Gln	Gln	Gly	Gln	Asn	Gln	Leu	340	345	350

Tyr Asn Glu Leu Asn Leu Gly Arg Arg Glu Glu Tyr Asp Val Leu Asp
 355 360 365

Lys Arg Arg Gly Arg Asp Pro Glu Met Gly Gly Lys Pro Arg Arg Lys
 370 375 380

Asn Pro Gln Glu Gly Leu Tyr Asn Glu Leu Gln Lys Asp Lys Met Ala
 385 390 395 400

Glu Ala Tyr Ser Glu Ile Gly Met Lys Gly Glu Arg Arg Arg Gly Lys
 405 410 415

Gly His Asp Gly Leu Tyr Gln Gly Leu Ser Thr Ala Thr Lys Asp Thr
 420 425 430

Tyr Asp Ala Leu His Met Gln Ala Leu Pro Pro Arg
 435 440

<210> 3

<211> 24

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 3

cccaaggcac tgatgttcac ctcc

24

<210> 4

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 4

tgagacaaaag tccccaatct ctgacag

27

<210> 5

<211> 26

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 5

ctgcagctgc tcctcaagta ctattc

26

<210> 6
 <211> 28
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Primer

<400> 6
 tcccggagaa ggtccacagt tcctcttt 28

<210> 7
 <211> 29
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Primer

<400> 7
 gaagcagcag agggtttgaa gccacatac 29

<210> 8
 <211> 27
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Primer

<400> 8
 ggcaggtctt cagttgctta tgaaggt 27

<210> 9
 <211> 27
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Primer

<400> 9
 gggtcctctt caggtccag aatatgt 27

<210> 10
 <211> 27
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Primer

<400> 10
 gcgaagaact caccctggac tggtcat 27

<210> 11
 <211> 30
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Primer

<400> 11
 gagctccaca gacaacaaga ggacgcagca 30

<210> 12
 <211> 27
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Primer

<400> 12
 gagctgcgac gttccttagt gactgtg 27

<210> 13
 <211> 30
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Primer

<400> 13
 cctcgtcagc ctgttggtcca atccttctgg 30

<210> 14
 <211> 28
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Primer

<400> 14
 cagcctcatc aatctgttct acttggt 28

<210> 15
 <211> 28
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Primer

<400> 15
 ccaccaggga ccacagttta tcattcaa 28

<210> 16
 <211> 27
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Primer

<400> 16
 acctggagag aatcctaagc tcatcat 27

<210> 17
 <211> 28
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Primer

<400> 17
 aggtcttgtg tccctgacag tcctggtt 28

<210> 18
 <211> 30
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Primer

<400> 18
 caagcaaaca ctgtagtgca gagcccttcc 30

<210> 19
 <211> 25
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Primer

<400> 19
 caagacatcc ataactgccc tacag 25

<210> 20
 <211> 27
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Primer

 <400> 20
 gtgtatgaaa cccaggacag ttcttac 27

 <210> 21
 <211> 29
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Primer

 <400> 21
 ccgtatttct ttcttatggt gttttggat 29

 <210> 22
 <211> 28
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Primer

 <400> 22
 caaagctctc catcgctgac tgttcaag 28

 <210> 23
 <211> 23
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Primer

 <400> 23
 atctaatacct gggaagagca aat 23

 <210> 24
 <211> 23
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Primer

 <400> 24
 ggcgtctggt accacgtggt caa 23

<210> 25
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 25
gtgaaagggc aaggacaaaa agc 23

<210> 26
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 26
gatatgcgaa cagtatctag gc 22

<210> 27
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 27
acataatcaa aggaaaggga gaa 23

<210> 28
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 28
tcctgattgg tcaggaaggg caa 23

<210> 29
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 29
tacctgatca aaagaatggg aga 23

<210> 30
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 30
ataaccatga caatatgtac tgg 23

<210> 31
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 31
ataaccacaa caacatgtac tgg 23

<210> 32
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 32
atagccacaa ctacatgtac tgg 23

<210> 33
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 33
agcttgcaag agttggaaaa cca 23

<210> 34
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 34
gattatgttt agctacaata ata 23

<210> 35
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 35
acaagtgac agggaaggga caa 23

<210> 36
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 36
acctacagaa cccaaggact cag 23

<210> 37
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 37
cagttgccct cggatcgatt ttc 23

<210> 38
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 38
gccgagatca aggctgtggg cag 23

<210> 39
<211> 23
<212> DNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 39

agaaccatct gtaagagtgg aac

23

<210> 40

<211> 23

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 40

catcaaataa tagatatggg gca

23

<210> 41

<211> 23

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 41

gtagtcctga aaaagggcac act

23

<210> 42

<211> 22

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 42

catctgtcaa agtggcactt ca

22

<210> 43

<211> 393

<212> DNA

<213> Homo sapiens

<220>

<221> CDS

<222> (1)..(393)

<400> 43

atg	aaa	tcc	ttg	agt	gtt	tcc	cta	gtg	gtc	ctg	tgg	ctc	cag	tta	aac	48
Met	Lys	Ser	Leu	Ser	Val	Ser	Leu	Val	Val	Leu	Trp	Leu	Gln	Leu	Asn	
1					5				10				15			

tgg	gtg	cag	agc	cag	cag	aag	gtg	cag	cag	agc	cca	gaa	tcc	ctc	agt	96
Trp	Val	Gln	Ser	Gln	Gln	Lys	Val	Gln	Gln	Ser	Pro	Glu	Ser	Leu	Ser	
		20						25					30			
gtc	cca	gag	gga	ggc	atg	gcc	tct	ctc	aac	tgc	act	tca	agt	gat	cgc	144
Val	Pro	Glu	Gly	Gly	Met	Ala	Ser	Leu	Asn	Cys	Thr	Ser	Ser	Asp	Arg	
		35					40					45				
aat	ttt	cag	tat	ttc	tgg	tgg	tac	aga	cag	cat	tct	gga	gaa	ggc	ccc	192
Asn	Phe	Gln	Tyr	Phe	Trp	Trp	Tyr	Arg	Gln	His	Ser	Gly	Glu	Gly	Pro	
	50					55					60					
aaa	gca	ctg	atg	tcc	atc	ttc	tct	gat	ggt	gac	aag	aaa	gaa	ggc	aga	240
Lys	Ala	Leu	Met	Ser	Ile	Phe	Ser	Asp	Gly	Asp	Lys	Lys	Glu	Gly	Arg	
	65				70				75						80	
ttc	aca	gct	cac	ctc	aat	aag	gcc	agc	ctg	cat	gtt	tcc	ctg	cac	atc	288
Phe	Thr	Ala	His	Leu	Asn	Lys	Ala	Ser	Leu	His	Val	Ser	Leu	His	Ile	
			85					90						95		
aga	gac	tcc	cag	ccc	agt	gac	tcc	gct	ctc	tac	ttc	tgt	gca	gtt	atg	336
Arg	Asp	Ser	Gln	Pro	Ser	Asp	Ser	Ala	Leu	Tyr	Phe	Cys	Ala	Val	Met	
			100					105					110			
gat	tat	aac	cag	ggg	aag	ctt	atc	ttt	ggg	cag	ggt	acc	aag	tta	tct	384
Asp	Tyr	Asn	Gln	Gly	Lys	Leu	Ile	Phe	Gly	Gln	Gly	Thr	Lys	Leu	Ser	
		115					120					125				
atc	aag	ccc														393
Ile	Lys	Pro														
		130														

<210> 44

<211> 131

<212> PRT

<213> Homo sapiens

<400> 44

Met	Lys	Ser	Leu	Ser	Val	Ser	Leu	Val	Val	Leu	Trp	Leu	Gln	Leu	Asn	
1				5					10					15		
Trp	Val	Gln	Ser	Gln	Gln	Lys	Val	Gln	Gln	Ser	Pro	Glu	Ser	Leu	Ser	
			20					25					30			
Val	Pro	Glu	Gly	Gly	Met	Ala	Ser	Leu	Asn	Cys	Thr	Ser	Ser	Asp	Arg	
		35					40					45				
Asn	Phe	Gln	Tyr	Phe	Trp	Trp	Tyr	Arg	Gln	His	Ser	Gly	Glu	Gly	Pro	
	50					55					60					
Lys	Ala	Leu	Met	Ser	Ile	Phe	Ser	Asp	Gly	Asp	Lys	Lys	Glu	Gly	Arg	
	65				70				75						80	
Phe	Thr	Ala	His	Leu	Asn	Lys	Ala	Ser	Leu	His	Val	Ser	Leu	His	Ile	
				85				90						95		

15

Arg Asp Ser Gln Pro Ser Asp Ser Ala Leu Tyr Phe Cys Ala Val Met
100 105 110

Asp Tyr Asn Gln Gly Lys Leu Ile Phe Gly Gln Gly Thr Lys Leu Ser
115 120 125

Ile Lys Pro
130

<210> 45
<211> 402
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (1)..(402)

<400> 45
atg ggc tcc aga ctc ttc ttt gtg gtt ttg att ctc ctg tgt gca aaa 48
Met Gly Ser Arg Leu Phe Phe Val Val Leu Ile Leu Leu Cys Ala Lys
1 5 10 15

cac atg gag gct gca gtc acc caa agt cca aga agc aag gtg gca gta 96
His Met Glu Ala Ala Val Thr Gln Ser Pro Arg Ser Lys Val Ala Val
20 25 30

aca gga gga aag gtg aca ttg agc tgt cac cag act aat aac cat gac 144
Thr Gly Gly Lys Val Thr Leu Ser Cys His Gln Thr Asn Asn His Asp
35 40 45

tat atg tac tgg tat cgg cag gac acg ggg cat ggg ctg agg ctg atc 192
Tyr Met Tyr Trp Tyr Arg Gln Asp Thr Gly His Gly Leu Arg Leu Ile
50 55 60

cat tac tca tat gtc gct gac agc acg gag aaa gga gat atc cct gat 240
His Tyr Ser Tyr Val Ala Asp Ser Thr Glu Lys Gly Asp Ile Pro Asp
65 70 75 80

ggg tac aag gcc tcc aga cca agc caa gag aat ttc tct ctc att ctg 288
Gly Tyr Lys Ala Ser Arg Pro Ser Gln Glu Asn Phe Ser Leu Ile Leu
85 90 95

gag ttg gct tcc ctt tct cag tca gct gta tat ttc tgt gcc agc agc 336
Glu Leu Ala Ser Leu Ser Gln Ser Ala Val Tyr Phe Cys Ala Ser Ser
100 105 110

gat ttc gcc ggg aca ggg ggc ttc tat gaa cag tac ttc ggt ccc ggc 384
Asp Phe Ala Gly Thr Gly Gly Phe Tyr Glu Gln Tyr Phe Gly Pro Gly
115 120 125

acc agg ctc acg gtt tct 402
Thr Arg Leu Thr Val Ser
130

<210> 46
 <211> 134
 <212> PRT
 <213> Homo sapiens

<400> 46
 Met Gly Ser Arg Leu Phe Phe Val Val Leu Ile Leu Leu Cys Ala Lys
 1 5 10 15
 His Met Glu Ala Ala Val Thr Gln Ser Pro Arg Ser Lys Val Ala Val
 20 25 30
 Thr Gly Gly Lys Val Thr Leu Ser Cys His Gln Thr Asn Asn His Asp
 35 40 45
 Tyr Met Tyr Trp Tyr Arg Gln Asp Thr Gly His Gly Leu Arg Leu Ile
 50 55 60
 His Tyr Ser Tyr Val Ala Asp Ser Thr Glu Lys Gly Asp Ile Pro Asp
 65 70 75 80
 Gly Tyr Lys Ala Ser Arg Pro Ser Gln Glu Asn Phe Ser Leu Ile Leu
 85 90 95
 Glu Leu Ala Ser Leu Ser Gln Ser Ala Val Tyr Phe Cys Ala Ser Ser
 100 105 110
 Asp Phe Ala Gly Thr Gly Gly Phe Tyr Glu Gln Tyr Phe Gly Pro Gly
 115 120 125
 Thr Arg Leu Thr Val Ser
 130

<210> 47
 <211> 9
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 peptide

<400> 47
 Lys Ile Phe Gly Ser Leu Ala Phe Leu
 1 5

<210> 48
 <211> 10
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 peptide

<400> 48

Thr Leu Gln Gly Leu Gly Ile Ser Trp Leu
1 5 10

<210> 49

<211> 10

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<400> 49

Val Met Ala Gly Val Gly Ser Pro Tyr Val
1 5 10

<210> 50

<211> 10

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<400> 50

Val Leu Gln Gly Leu Pro Arg Glu Tyr Val
1 5 10

<210> 51

<211> 7

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<400> 51

His Leu Tyr Gln Gly Gln Trp
1 5

<210> 52

<211> 9

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<400> 52

Arg Leu Leu Gln Glu Thr Glu Leu Val
1 5

<210> 53

<211> 9

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
peptide

<400> 53

Lys Ile Pro Val Ala Ile Lys Val Leu
1 5

<210> 54

<211> 9

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
peptide

<400> 54

Cys Leu Thr Ser Thr Val Gln Leu Val
1 5

<210> 55

<211> 9

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
peptide

<400> 55

Gln Leu Met Pro Tyr Gly Cys Leu Leu
1 5

<210> 56

<211> 9

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
peptide

<400> 56

Val Leu Val Lys Ser Pro Asn His Val
1 5

<210> 57

<211> 9

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
peptide

<400> 57

Asp Ile Asp Glu Thr Glu Tyr His Ala
1 5

<210> 58

<211> 9

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
peptide

<400> 58

Asp Leu Leu Glu Lys Gly Glu Arg Leu
1 5

<210> 59

<211> 9

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
peptide

<400> 59

Glu Leu Val Ser Glu Phe Ser Arg Met
1 5

<210> 60

<211> 10

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
peptide

<400> 60
Glu Leu Val Ser Glu Phe Ser Arg Met Ala
1 5 10

<210> 61
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
peptide

<400> 61
Leu Val Ser Glu Phe Ser Arg Met Ala
1 5

<210> 62
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
peptide

<400> 62
Asp Leu Val Asp Ala Glu Glu Tyr Leu
1 5

<210> 63
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
peptide

<400> 63
Thr Leu Ser Pro Gly Lys Asn Gly Val
1 5

<210> 64
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
peptide

<400> 64

Lys Leu Val Gly Lys Leu Asn Trp Ala
1 5

<210> 65

<211> 15

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Linker
peptide

<400> 65

Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
1 5 10 15